Community Computer Corporation
Data Bulletin Number 1020

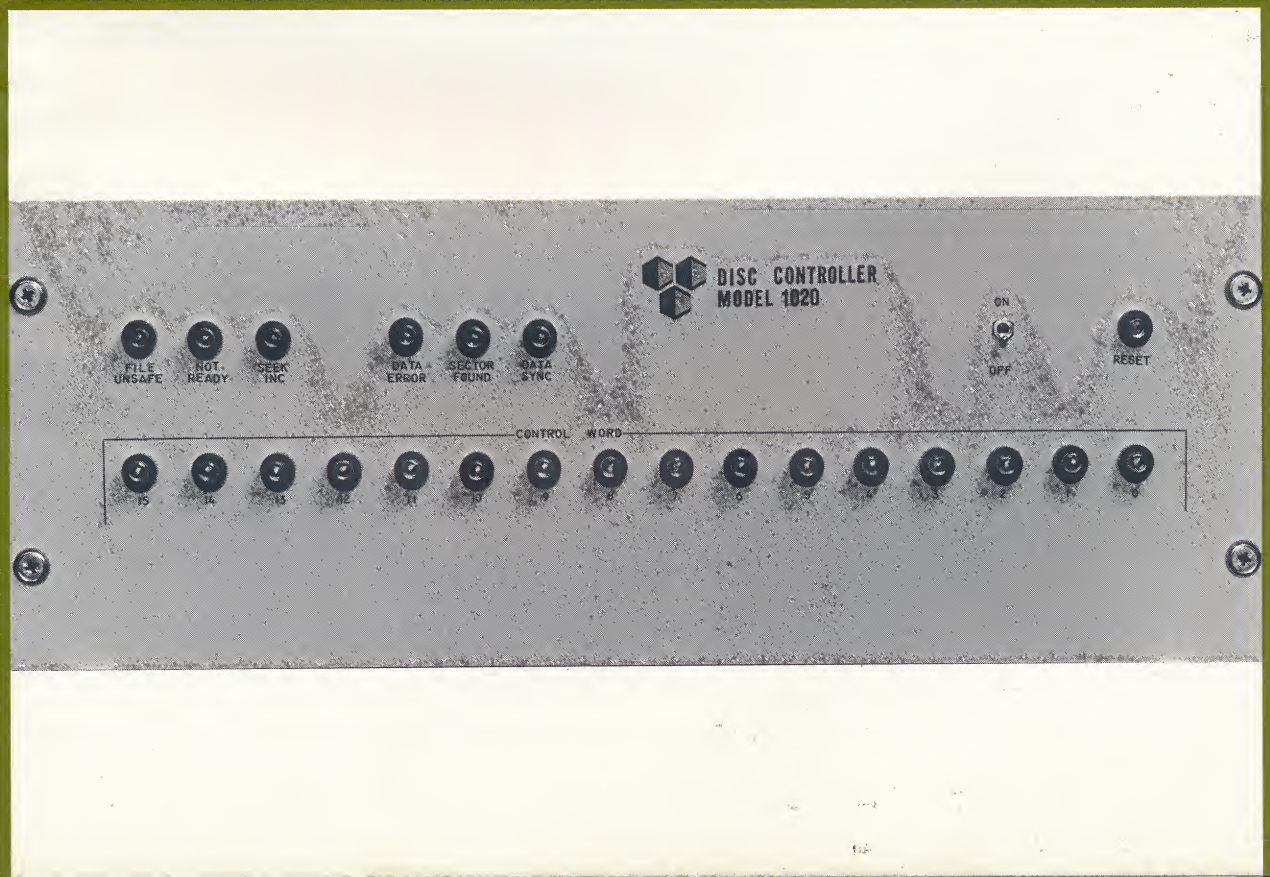
Model 1020 Disc Controller

A plug-in hardware package for interfacing one or two small computers with up to eight CCC 1011, IBM 2311, or any plug compatible Disc Drive

The Community Computer Corporation Model 1020 Disc Controller provides a simple method of adding mass random access storage to a small computer. The controller allows the small CPU to store or retrieve data simply and efficiently, using a short instruction set. The 1020 is organized with the programmer in mind. The short driving routine means less space needed in the CPU and hardware cyclic checking provides built-in data transfer accuracy.

Two CPUs and Eight Disc Drives

The Model 1020 was originally designed to permit either one or two Hewlett-Packard Computers to communicate with the CCC 1011, the IBM 2311, or any plug compatible unit. A single unit can serve as the interface for one or two CPUs and up to eight disc drives. With some modification the Model 1020 Controller will easily interface most other 16-bit word length processors with any other compatible disc storage units. It requires only a short sequence of instructions from the CPU, to initiate a search for any one of 40,600 sectors in the disc drive. Up to 20,000 bytes may be transferred in blocks of one to 128 sectors from a single command. The starting sector is also searched out in this one command. When the addressed sector is located, data can be transferred at up to 156K bytes per second.



Plug-In Design

The Model 1020 plugs into a pair of computer I/O interface cards and directly into the disc drive. (The disc drive may be separated from the computer by a distance of up to 50 feet.) With the exception of the connecting cables, no other hardware is required When other processors are used, a buffer with interrupt logic is recommended between the Model 1020 and the backplane wiring of the processor.

Accurate Data Transfer

The Model 1020 provides for accurately transferred data through a 16-bit cyclic check code word that is appended to each data block. The word is a function of the data in the block, i.e., the word is automatically checked by the Model 1020 when data is read back to assure that no bits have been lost or added. In addition, write and erase currents are monitored to assure proper drive and a check incorporated in the hardware makes certain that the data written has been accomplished.

Self-Contained Unit

The Model 1020 is a compact, rack-mounting device with an integral DC power supply; it requires only connection to either a 208 volt, 3 phase or 230 volt single phase source to become operational. Integrated circuits are used throughout the controller to assure a high degree of reliability with low power consumption and heat generation. The 16-bit register on the front of the Model 1020 panel displays the last control word issued, to aid in debugging software and in hardware/software troubleshooting. A crystal reference provides accurate determination of synchronization of sector markers.

Disc Drive DC Supply

The CCC 1011 Disc Drive contains its own DC power supply and requires no external DC for drive power. The IBM 2311, however, does not have this feature. As a result, it is necessary for the Controller to supply the necessary power. The CCC 1025 power supply should be added to the system when considering any drive that does not contain its own DC power supply.

Minimal Software Requirements

Since the Model 1020 is designed to interface computers and mass storage units with a minimum of programming, only a short software driver is required. This frees valuable core in the CPU and eliminates the need for any extensive software preparation on the part of the user.

Software Provided

Each Model 1020 is provided with a complete diagnostic routine that permits the user to totally exercise all components of the system—CPU, controller, disc drive and disc pack—from the Teletype keyboard. The user can write and read any bit pattern over all areas. Errors of any type are located and described on the system console. These diagnostics check the Model 1020 completely, and assure the user of a totally defined disc drive and pack.

Software Driver

The CCC Model 1020 Disc Controller is designed with ease of programming in mind, i.e., it incorporates features that would normally have to be supplied by the user's software. Disc Drivers compatible with Fortran and Assembly Language are furnished and have the capability of initiating several search operations, as well as a simultaneous data transfer while awaiting completion of the search operation. The status of the Controller or any one of the drives is available at all times. Where possible, device dependent delays are eliminated to provide the user with rapid response to disc operations.

The drivers supplied provide the following capabilities:

```
Read
Write
Status
Type of next data item
Positioning Operations
Buffer Allocation
```

Fortran

```
CALL DISC (IRQCD, IFILE, IBUFR, IBUFL,
ITRAK, ISECT, IOFST)
WHERE:
IRQCD=REQUEST CODE
IFILE=FILE NO. (1 of 8)
IBUFR=BUFFER AREA FOR TRANSFER
IBUFL=BUFFER LENGTH
ITRAK=TRACK NO.
ISECT=SECTOR NO.
IOFST=INTER-SECTOR DATA OFF-SET
      (OPTIONAL)
```

Assembly Language (BCS)

```
EXT .IOC.
 •
 •
 •
 •
JSB .IOC.
OCT  <FUNCTION×SUB-FUNCTION×UNIT-
      REF>
{JMP}
{JSB} <REJECT ADDRESS>
DEF  <DISC PARAMETER LIST>
      (TRACK, SECTOR, BUFFER)
DEC  <BUFFER LENGTH>
```

Assembly Language (Relocatable)

```
EXT  DISC
 •
 •
 •
 •
JSB   DISC
DEF  <RETURN>
DEF  <REQUEST CODE> [,I]
DEF  <FILE NO.> [,I]
DEF  <BUFFER> [,I]
DEF  <BUFFER LENGTH> [,I]
DEF  <TRACK> [,I]
DEF  <SECTOR> [,I]
DEF  <INTER-SECTOR DATA OFFSET> [,I]
      (OPTIONAL)
     <NORMAL RETURN>
```

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Simplified Plug-In Field Wiring

Addressable Sectors: 40,600 Disc Pack

Transfer Rate: 156K Bytes/Second

Actual Data Capacity: 6.5 x 10^6 Bytes (above synchronization and error detecting Bytes)

Data Block Size: 1 to 128 sectors

Accuracy: (a) A 16-bit cyclic check (code is appended to each data block)
(b) Write and Erase current sensing is provided

Power: 230 volts AC, single phase or 208 volts 3 phase; current dependent on number of 1011's powered

Dimensions: 19″ wide, 10″ high, 20″ deep

Weight: 25 pounds

Control Word Length: 16 bits

Operating Conditions: 10° to 50°C, at 20% to 80% relative humidity

Unit Price: $10,500 F.O.B., Fort Washington, Pa. Specifications subject to change without notice.

Community Computer Corporation
Fort Washington Industrial Park, Fort Washington, Pa. 19034
Phone (215) 643-5515